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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/589,801	**Applicant(s)** ANTE ET AL.	
	Examiner FARHANA HOQUE	**Art Unit** 2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 2/6/2009.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Applicant’s amendment filed on February 6, 2009. In virtue of this amendment, claims 1-30 remain pending in the instant application.

Response to Arguments

1. Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that independent claim 11 patentably distinguishes over Spencer at least by reciting “collecting particles by a sensor in a gas stream.” The Office Action alleges that the above identified feature of claim 11 is rendered obvious by Fig. 2 of Spencer. However, Fig. 2 merely illustrates an exploded view of a sensing element used in a fluid contamination measuring system illustrated in Fig. 1 of Spencer. Neither Fig. 1, nor Fig. 2, nor the rest of Spencer teaches or suggest that the sensor in Spencer collects particles or that the sensor is placed in a gas stream.

The examiner respectfully disagrees. Reading the claims in the broadest sense, the particles are passing through a sensor. After detection, the pulses resulting from particle flow through the sensor are amplified and counted or averaged over a unit time to give measures of total contamination, or average contamination. Thus, particles are being collected to determine the particle

concentration. Further, Fig. 1 illustrates a sensor suitable for use in a fluid transfer line or pipe and thus the sensor is considered to be placed in a gas stream (col. 2, lines 30-32).

Applicant further argues, that nothing has been cited or found in Spencer that teaches or suggests "determining a reference value of a characteristic variable of the resonant circuit which can vary as a result of particle load of the sensor" and "determining a change in the characteristic variable brought about by the particle load compared to the reference value." In Spencer, impurities in the fluid passing between the sensor and pipe walls, cause rapid and temporary fluctuation of the number of impurities in the fluid is counted by counting the number of such fluctuations (see col. 5, lines 13-23, in Spencer). The method described in Spencer does not determine "a change in the characteristic variable brought about by the particle load compared to the reference value" as recited in claim 11, but merely counts the number of fluctuations of the voltage occurring when passing impurities affect the dielectric value, and, therefore, the capacitance between the sensor and pipe's walls (see col. 3 lines 18-21 in Spencer). No suggestion of comparing anything with a reference value has been found in Spencer.

The examiner respectfully disagrees. Reading the claims in the broadest sense, the output signal from the peak detector is a direct voltage whose amplitude corresponds to the output from the detector when no particles are

present; i.e. the operating point considered the reference value Vo. When no particles are present the oscillator frequency intersects the curve of the voltage output as a function of frequency providing the output voltage, which is considered therefore to be claimed as the reference value. However, if a particle having a higher dielectric constant than the fluid passes through the sensor, the capacitance of the condenser is increased lowering the resonant frequency of the LC circuit. This results in the LC circuit having the characteristic curve which intersects the oscillator frequency and provides a higher output voltage. The reference value comparison is demonstrated in Fig. 4. (col. 3, lines 45-55).

Claim Objections

2. Claim 30 is objected to because of the following informalities:

Claim 30, line 9, "sooth" should be changed to - - soot - -;

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 11, 12, 16, 23, 24, 27, 29 and 30 are rejected under 35 U.S.C 102(b) as being anticipated by Spencer (U.S. Patent No. 3,231,815).

With respect to claim 11, Spencer discloses, a method for monitoring particle concentration in a gas stream, comprising: (1) collecting particles by a sensor (see Fig. 2) in the gas stream (col. 2, lines 12-16), the sensor (see Fig. 2) integrated as a capacitive element (col. 6, lines 65-69) into an electromagnetic resonant circuit (see Fig. 1); exciting the resonant circuit with an alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier; also col. 3, lines 24-29); (2) determining a reference value of a characteristic variable of the resonant circuit, the characteristic variable varying as a result of particle load of the sensor (col. 3, lines 45-49), the reference value being determined when the sensor is not loaded (see col. 3, lines 45-49), where the characteristic variable is one of a resonant frequency of the resonant circuit and a voltage across the sensor when the resonant circuit is excited by the alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier) having a fixed frequency and a fixed amplitude (see col. 6, line 71 – col. 7, line 2); and (3) determining a change in the characteristic variable brought about by the particle load compared to the reference value (see col. 5, lines 13-21).

With respect to claim 12, Spencer discloses, the method as recited in claim 11, wherein a frequency of the alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier) exciting the resonant circuit is tuned to determine the resonant frequency of the resonant circuit, as the characteristic variable (see Fig. 4, also col. 3, lines 24-32 and lines 49-56).

With respect to claim 16, Spencer discloses, a device, excited with alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier), for monitoring particle concentration in a gas stream, comprising:
an electromagnetic resonant circuit (see Fig. 1) excited with the alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier); a sensor (see Fig. 2) in the gas stream, integrated as a capacitive element into the electromagnetic resonant circuit (col. 6, lines 65-69), collecting particles, having a nonconductive base body made of porous material and two electrodes spaced apart from one another [8, 24] (see Fig. 1, *the space between the two electrodes is the nonconductive base body made of air, the air being a porous material); and a characteristic variable determiner determining change in a characteristic variable of the electromagnetic resonant circuit (col. 5, lines 13-21), the characteristic variable varying as a result of particle load of said sensor, from a reference value determined when said sensor [see Fig. 2] is not loaded due to having been heated above an ignition temperature of the particles, where the characteristic variable is one of a resonant frequency of the resonant circuit and

a voltage across the sensor when the resonant circuit is excited by the alternating voltage [64] (see Fig. 3 *termed as an alternating voltage amplifier) having a fixed frequency and fixed amplitude (col. 6, line 71 – col. 7, line 2).

With respect to claim 23, Spencer discloses the device as recited in claim 16, wherein the electrodes are embedded in the nonconductive base body [8, 24] (see Fig. 1).

With respect to claim 24, Spencer discloses the device as recited in claim 16, wherein the electrodes [8, 24] (see Fig. 1) are arranged on a side of the nonconductive base body inaccessible to the particles (see Fig. 1).

With respect to claim 27, Spencer discloses the device as recited in claim 16, wherein the particles are soot particles in an exhaust gas stream of an internal combustion engine (col. 1, lines 9-15).

With respect to claim 29, Spencer discloses the device as recited in claim 11, wherein the particles are soot particles in an exhaust gas stream of an internal combustion engine (col. 1, lines 9-15).

With respect to claim 30, Spencer discloses an apparatus for monitoring soot particle concentration in a gas stream, comprising:

an electromagnetic resonant circuit excited with an alternating voltage of variable frequency; a sensor (see Fig. 2) in the gas stream, integrated as a capacitive element (col. 6, lines 65-69) into the electromagnetic resonant circuit (see Fig. 1), collecting soot particles between electrodes [8,24] (see Fig. 1) of the capacitive element (col. 6, lines 65-69); and a particle concentration estimator [86] (see Fig. 3; also col. 5, lines 52-55) estimating the soot particle concentration in the gas stream (col. 2, lines 12-16) based on a change in a resonance frequency of the electromagnetic resonant circuit (see Fig. 1) due to the collected sooth particles in the sensor (see Fig. 2).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of

35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 13-15, 25, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spencer, (U.S. Patent No. 3,231,815) in view of Martin et al. (U.S. Patent No. 6,003,305).

With respect to claim 13, Spencer discloses the method as recited in claim 12.

Spencer does not disclose heating the sensor, during the determining of the reference value of the characteristic variable, to a temperature below an ignition temperature of the particles and sufficient to remove impurities adhering to the sensor.

Martin et al. discloses, heating the sensor below an ignition temperature of the particles to remove impurities adhering to the sensor (see Martin et al. col. 3, lines 25-35; also col. 21, lines 38-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to supplement the method of Spencer with a step of heating the sensor below an ignition temperature of the particles to remove impurities as taught by Martin et al. to increase destruction and removal efficiency of soot (col. 5, line 61) so as to predictably ensure more accurate readings.

With respect to claim 14, Spencer et al. discloses the method as recited in claim 12.

Spencer does not disclose heating the sensor to a temperature above the ignition temperature of the particles to remove a particle load.

Martin et al. discloses, heating the sensor above the ignition temperature of the particles to remove a particle load (col. 26, lines 11-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to supplement the method of Spencer with a step of heating the sensor above the ignition temperature of the particles to remove a particle load as taught by Martin et al. to increase destruction and removal efficiency of soot (col. 5, line 61) so as to predictably ensure more accurate readings.

With respect to claim 15, the combination of Spencer and Martin et al. disclose all the limitations according to claim 14, wherein the particles are soot particles in an exhaust gas stream of an internal combustion engine (see Martin et al. col. 1, lines 6-10).

With respect to claim 25, Spencer discloses the device as recited in claim 16.

Spencer does not disclose a heating device to heat the sensor above the ignition temperature of the particles prior to determining of the reference value of the characteristic variable.

Martin et al. discloses, heating the sensor above an ignition temperature of the particles prior to determining the reference value of the characteristic variable (col. 26, lines 11-14)

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Spencer to include a heating device to heat the sensor above an ignition temperature of the particles as taught by Martin et al. to increase destruction and removal efficiency of soot (col. 5, line 61) so as to predictably ensure more accurate readings.

With respect to claim 26, Spencer discloses the device as recited in claim 16.

Spencer does not disclose the base body to include a catalytically active layer.

Martin et al. discloses the base body to include a catalytically active layer (col. 9, lines 22-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Spencer to include a base body to have a catalytically active layer as taught by Martin et al. to reduce Nitrogen oxide emissions from internal combustion engines (col. 3, lines 25-31) which will make the device more environment friendly.

With respect to claim 28, Spencer discloses the method as recited in claim 11.

Spencer does not disclose heating the sensor to a temperature below an ignition temperature of the particles and sufficient to remove impurities adhering to the sensor.

Martin et al. discloses, heating the sensor below an ignition temperature of the particles and sufficient to remove impurities adhering to the sensor (see Martin et al. col. 3, lines 25-35; also col. 21, lines 38-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to supplement the method of Spencer with a step of heating the sensor below an ignition temperature of the particles and sufficient to remove impurities as taught by Martin et al. to increase destruction and removal efficiency of soot (col. 5, line 61) so as to predictably ensure more accurate readings.

9. Claims 17-19 are rejected under 35 U.S.C 103(a) as being unpatentable over Spencer, (U.S. Patent No. 3,231,815) in view of Ziegler (U.S. Patent No. 5,447,076).

With respect to claim 17, Spencer discloses all the limitations according to claim 16.

Spencer does not disclose the device, wherein the nonconductive base body is composed of ceramic (see Ziegler col. 5, lines 35-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Spencer to include a nonconductive base body made of ceramic as taught by Ziegler to predictably provide a region which supports magnetic flux from magnetic fields established by current through conductor.

With respect to claim 18, the combination of Spencer and Kiegler disclose all the limitations according to claim 17, wherein the electrodes [8, 24] (see Spencer Fig. 1) are embedded in the nonconductive base body (see Kiegler col. 5, lines 35-36).

With respect to claim 19, the combination of Spencer and Kiegler disclose all the limitations according to claim 18, wherein the electrodes are arranged on a side of the nonconductive base body (see Kiegler col. 5, lines 35-36) inaccessible to the particles [8, 24] (see Spencer Fig. 1).

10. Claim 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spencer (U.S. Patent No. 3,231,815) in view of Kiegler (U.S. Patent No. 5,447, 076) as applied to claims 17- 19 above, and further in view of Martin et al. (U.S. Patent No. 6,003,305).

With respect to claim 20, the combination of Spencer and Kiegler disclose all the limitations of claim 19.

The combination of Spencer and Kiegler do not disclose all the limitations of claim 20.

Martin et al. discloses, a heating device to heat the sensor above the ignition temperature of the particles prior to determining the reference value of the characteristic variable (col. 26, lines 11-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of the combination of Spencer and Kiegler by additionally arranging a heating device as taught by Martin et al. to heat the sensor in order to determine the reference value of the characteristic variable to increase destruction and removal efficiency of soot (col. 5, line 61) so as to predictably ensure more accurate readings.

With respect to claim 21, the combination of Spencer, Kiegler, and Martin et al., disclose all the limitations according to claim 20, wherein the base body includes a catalytically active layer (see Martin et al. col. 9, lines 22-37; also col. 3, lines 25-30).

With respect to claim 22, the combination of Spencer, Kiegler, and Martin et al., disclose all the limitations according to claim 21, wherein the particles are soot particles in an exhaust gas stream of an internal combustion engine (see Martin et al. col. 1, lines 6-10).

Citation of Pertinent Prior Art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Borchard (U.S. Patent No. 5,150,759) discloses a capacitor-sensor.

Jung et al. (U.S. Patent No. 5,763,352) discloses a catalyst composition for the purification of the exhaust of diesel vehicles.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FARHANA HOQUE whose telephone number is (571)270-7543. The examiner can normally be reached on Monday - Friday 8:30-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/FARHANA HOQUE/
Examiner, Art Unit 2831

/Diego Gutierrez/
Supervisory Patent Examiner,
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